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PAGES 161-176

# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Anti-Aircraft Vulcan

See Page 164

A SCIENCE SERVICE PUBLICATION

# FOR THE BUSINESS MAN WHO REFUSES TO STAGNATE



HALF the world is half asleep! Men who could be making *twice* their present salaries are coasting along, hoping for promotions but doing nothing to bring themselves forcefully to the attention of management.

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## GENERAL SCIENCE

# Scientific Opinion Polled

**Science Service pioneers new method of obtaining and revealing expert scientific opinion on suitable problems by Grand Jury panels.**

► A NEW METHOD of collecting and announcing expert opinion on important questions dealing with science and technology has been developed by SCIENCE SERVICE, the institution for the interpretation of science.

To deliberate upon each scientific question considered, a special body of experts upon the particular question is empanelled by mail questionnaire.

Science Service Grand Jury is the name applied to such a panel.

Each member renders his judgment independently and anonymously.

No member of the body of experts polled is referred to by name in the report prepared, but many comments that are offered are summarized or quoted anonymously to enlighten the question.

The character of the panel, the percentage of the experts who reply, the spread of their opinions and other particular statistical data are given in detail.

It is expected that these inquiries will become one of the most important summaries.

## ASTRONOMY

## No Intelligent Life on Mars

► EXPERTS say there is life on the planet Mars. But there is no intelligent life on that ruddy planet.

A panel of experts on Mars, polled by the new Science Service Grand Jury technique, has voted almost unanimously "yes" when asked the question: "Is there any kind of life on Mars?"

With even greater accord, the experts also gave a "no" answer to the question: "Is there any form of intelligent life on Mars?"

The planet, Mars, now easily visible in the southeastern evening sky, made a close approach to earth at midnight EST on Sept. 6, when it was only 35,120,000 miles away, closer than it has been since 1924. Not until 1971 will it come even nearly as close.

SCIENCE SERVICE therefore formed a Grand Jury of 49 experts, mostly astronomers, who have studied or observed Mars, or who head observatories in the United States and Canada. Of these, 75% (37 experts) returned ballots.

On the six questions submitted, positive "yes" or "no" answers were given by 60% to 90% of the panel, depending on the question.

On the "any kind of life" on Mars question, the vote was: yes—26 (70%), no—1

tions of scientific opinion available to the public.

Those selected as members of these Science Service Grand Juries are assured they will not be identified by name, position or otherwise. They are asked to answer "yes" or "no" to carefully phrased questions, set in a proper framework by a short explanation of the problem considered.

A new Grand Jury panel is selected for each inquiry. For instance, the first inquiry to be announced polled experts on the planet Mars, which is now making its closest approach in many years to the earth. The Mars jury was selected largely from directors of observatories and scientists who have done actual work concerning the planet.

Most of the experts invited to serve have done so, only a few refusing on the grounds that such polls should not be undertaken.

Additional inquiries are underway. Further polls are planned as scientific problems become suitable for such assay.

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(3%), not voting—10 (27%). On intelligent life on Mars, the vote was reversed: 27 (73%) voting no, 10 (27%) not voting, and no "yes" votes.

There is a "lower form of life, like moss or lichens" on Mars, the experts concluded. The vote was: yes—25 (67%), no—1 (3%), not voting—11 (30%).

The experts would therefore have no expectation of being able to communicate

## ASTRONOMY

## Man Not Alone in Cosmos

► THERE ARE CREATURES roughly comparable to man in the universe, in the opinion of leading astronomers. Man is not alone. There are other worlds than ours.

This is the case, even though astronomers are practically unanimous in believing that there is no intelligent life on Mars, the planet now making its closest approach to the earth in years.

In a Science Service Grand Jury inquiry, 37 astronomers decided 23 (62%) yes, 1 (3%) no, and 13 (35%) not voting on the question: Is there a probability that

with Mars for there are no intelligent beings there in their opinion. Their predominant opinions that there is a very low order of vegetable life there fits in with what is known about the physical conditions on the ruddy planet.

"Will man ever travel to Mars?" This question was asked the experts. Somewhat surprisingly, many believed that space travel would take human beings to Mars. Two-thirds of those who answered the question believe that there would eventually be travel across interplanetary space to the planet. The vote was: yes—15 (40.5%), no—7 (19%), not voting—15 (40.5%).

One eminent astronomer in his anonymous discussion asked why man should want to go to Mars, saying: "The same amount of money or energy spent on making earth a better place on which to live would do more good." Another commented: "Remotely possible but terribly expensive." "After many decades," another expert said.

As to travel to Mars, another opinion is: "It is possible but it is an open question whether such a journey will in fact be accomplished. Already rocket development has reached the point where we may reasonably expect the journey to be possible in 50 years, barring self-destruction of humanity."

The Mars experts hesitated over "intelligent" life. "Is there intelligence in an electron with a memory or in a sunflower?" asked one. The canals on Mars indicate intelligent life, another expert said, but the low atmospheric density argued that this life has been extinct for an immense period.

"The earth is suitable as a producer and a home of intelligent life," another astronomer said, "yet did not possess it for 99.997% of its history of 5,000,000,000 years. It is doubtful whether an observer on Venus would have seen the change on the earth produced by man."

Not all of the experts polled approved the method of making such inquiry. One said: "Scientific matters are not settled by counting noses." Another: "Childish and ridiculous." "To collect votes from scientists on any scientific question is misleading and unscientific," another voted.

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planets outside the solar system are inhabited by life roughly comparable to man?

This means, in the opinion of these experts, that far beyond the reach of space travel and even beyond the view of telescopes, attached to some of the billions of billions of stars in the millions of galaxies of far-flung space, there is a good chance of life somewhat like ourselves.

The same Science Service Grand Jury decided that there is a probability of planets of stars other than the sun. The opinion was yes—33 (89%), not voting—4 (11%), and no negative votes.

Admittedly in the realm of speculation because no observations can be made of satellite of even the closest stars in our own Milky Way galaxy, astronomical opinion as shown by this poll does hold that there must, among the millions upon millions of stars, be some that have acquired planets like the nine in the solar system.

There are literally billions of stars in the great galaxy of stars in which we are located, the Milky Way. This can be seen stretching across the sky on a clear night with only the closest and most brilliant of the stars visible to our eyes.

There are millions of galaxies like the Milky Way. And in our galaxy alone there must be hundreds of thousands of stars

much like our sun. Such vastness of the universe and its heavenly bodies has allowed the astronomers to express their belief in other worlds than ours.

In discussing planets outside the solar system, one astronomer observed that the probability of life comparable to man is extremely small for a given planet, even granted physical conditions similar to the earth. He based his favorable answer more on philosophical grounds than astronomical.

What is comparable to man—rats, apes, birds?—asked another astronomer who voted "yes" on extra-solar system inhabitants.

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#### ENDOCRINOLOGY

## Pure Skin Color Hormones

► INTERMEDIN, the pigmentation hormone that gives color to the skin, has been isolated in pure form and its chemical structure determined by University of California scientists.

The research on what has appeared a minor hormone has broad implications for progress in treatment of metabolic diseases.

The work marks the first time a specific biological function apparently can be pinned down to a specific structural segment of a large complex pituitary hormone.

It shows hormones like ACTH are probably several hormones rolled into one. Possibly purification or synthesis of the fragments may bring better, more specific treatment.

The scientists, after purifying intermedin, which is known as MSH or melanocyte-stimulating hormone, showed it is composed of 18 amino acids in a simple peptide chain.

The striking thing is that a segment of seven of these amino acids are arranged in the same sequence as a similar segment of ACTH. The sequence is methionine, glutamic acid, histidine, phenylalanine, arginine, tryptophane, glycine.

ACTH has been known to contain MSH activity for many years and, until recently, was believed its only source. Recently, however, extracts of MSH were obtained and this secretion was identified as a separate hormone produced by the intermediate lobe of the pituitary.

This separate hormone could darken the skin of frogs, fish and other animals just as ACTH could. The University of California scientists say a segment of seven amino acids in both hormones is undoubtedly responsible for pigmentation. In ACTH this sequence acquires adrenal-stimulating activity because of the different order of amino acids on each side.

The scientists believe the wide variety of biological effects of the large pituitary hormone molecules eventually will be pinned down to structural segments of the molecules.

For example, ACTH causes fatty liver and an increase of red blood cells in addition to stimulating the adrenals and caus-

ing pigmentation. Small segments may be responsible not only for pigmentation but for other activities as well.

The research is reported in the *Journal of the American Chemical Society* (Sept. 4). The scientists conducting the research are Drs. Irving I. Geschwind, C. H. Li and Livio Barnafi, all of the Hormone Research Laboratory at Berkeley. Dr. Li and other colleagues previously have isolated five pituitary hormones, including ACTH, and growth, lactogenic, interstitial-cell-stimulating and follicle-stimulating.

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#### TECHNOLOGY

## Vulcan Gun Developed For Use Against Jets

### See Front Cover

► THE VULCAN, a fast-firing 20 millimeter gun, was designed to keep up with the ever-increasing speeds of jet aircraft.

It is also known as the "Gatling gun" because it operates in a manner similar to that of the original "Gatling gun" invented in 1862.

This design was chosen by General Electric engineers and Army Ordnance officers because its rotating six-barreled cluster offered the most desirable characteristics for producing the increased rate of fire.

Extensive testing of the new armament system has been underway for over two years at the Air Force Armament Center. It has included ground firing, air-to-air firing and all-weather operation in a climatic hanger.

Shown on the cover of this week's SCIENCE NEWS LETTER is the Vulcan undergoing one of the tests made to prove its operability at temperatures as low as 70 degrees below zero Fahrenheit.

The weapon is 72 inches long and weighs approximately 300 pounds. It is named after the ancient Roman god of fire. The gun is externally powered by either electricity or hydraulic fluid.

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## RADIO

Saturday, Sept. 22, 1956, 1:45-2:00 p.m., EDT  
"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Harry C. Kelly, assistant director for scientific personnel and education, National Science Foundation, Washington, D. C., will discuss "Scientists for the Future."

"Adventures in Science" will not be heard again until December on account of the fogball season. Listen in then. Check your program listings.

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## PHYSIOLOGY

**Eight Hours' Sleep Apparently Necessary**

► THE TRADITIONAL eight hours of sleep is apparently what the body needs.

This was shown when members of the British North Greenland Expedition were permitted to sleep at any time they wanted during the 24-hour nights of Arctic winter.

Results of this "demand feeding" of sleep, similar to the "demand feeding" of babies who are given the bottle whenever hungry, were reported to the British Association for the Advancement of Science meeting in Sheffield, England, by Drs. H. E. Lewis and J. P. Masterton of the Medical Research Council, Hampstead, London.

"During the dark period, members were going to bed and taking naps at all times over the 24 hours, and one was given the impression that they were sleeping excessively," the scientists reported, but actually they were not. When the sleep was totaled up for the month, it was found the expedition members averaged 7.9 hours a day, in spite of the fact they were at liberty to sleep practically as long as they liked and when they liked.

The 25 members of the expedition were away for one to two years at a base less than 800 miles from the North Pole.

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## ASTRONOMY

**Huge Yellow Cloud Appears On Mars**

► A GREAT YELLOW CLOUD, probably of dust, enveloped much of the planet Mars about Sept. 1.

Spotted through the 82-inch telescope of McDonald Observatory on Mt. Locke, Texas, and reported by Dr. G. P. Kuiper, the Mars cloud was in the form of a shallow ribbon-like "W" 3,000 miles from tip to tip and 250 miles wide.

This means it extended over three-quarters of the diameter of the ruddy planet, which shines brilliantly in the southeastern sky.

On Aug. 30, the cloud was seen as some thousand miles wide, although it was not present the morning before.

It is believed to be the largest cloud ever reported on Mars. It resembles one spotted in 1954, also in the form of a "W." (See SNL, Dec. 18, 1954, p. 389.)

The cloud was over the area of the planet called Mars Sirenum. No water or carbon dioxide exists in any appreciable amount on Mars and the phenomenon is not like earthly clouds.

Astronomers at Lowell Observatory, Flagstaff, Ariz., also reported they had spotted the huge cloud.

One theory of such clouds, not held by the McDonald astronomers, is that such dust is caused by gigantic volcanic eruptions. This has been the view of Dr. Dean McLaughlin of the University of Michigan Observatory. (See SNL, July 3, 1954, p. 11.)

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**ATOMIC "CRYSTAL BALL"**—This round glass bulb is actually part of a field emission microscope being used to investigate atomic arrangement on the surface of an extremely fine tungsten needle point by scientists at the National Carbon Company's research laboratories in Parma, Ohio. Surrounded by a curved metal surface, the needle point is subjected to an electric field, and the electrons emitted are photographed to reveal surface details.

## RADIO ASTRONOMY

**Radio Signals From Mars**

► RADIO ASTRONOMERS are trying to tune in on signals from Mars. What they are listening for is natural radio waves from the planet itself, not from intelligent life on the ruddy planet.

Two other planets, Venus and Jupiter, have already been detected by the radio waves they broadcast.

Although at least three of the giant antennas known as radio telescopes that are used to pick up radio waves from space are being trained on Mars during September, astronomers in the United States will not know immediately whether or not they have heard Martian signals.

This is because the radio radiation, if present at all, is so weak that only statistical analysis of records made over a period of time will reveal its presence.

The radio radiation from Mars, if found, might result from two causes: the sun's heat reflected back into space by the planet, or thunderstorm-like disturbances in the very thin Martian atmosphere. Astronomers do not expect radio messages from Martians because they do not believe Mars can support life forms higher than lichens or mosses.

Mars is the object of special attention of both optical and radio astronomers be-

cause it approached within 35,120,000 miles of earth at midnight EST on Sept. 6.

A team of scientists at the Naval Research Laboratory, Washington, has tried to pick up Martian signals at a wavelength of 1.86 centimeters, or slightly less than half an inch, and at three centimeters, or about an inch and a quarter.

The radio astronomers are hopeful that, at the longer wavelength, they may have better luck in getting a direct signal from Mars, since there is less atmospheric absorption of radiation at three centimeters than at 1.86 centimeters.

Also in Washington, scientists at Carnegie Institution's Department of Terrestrial Magnetism are looking for Mars at 22 megacycles, part of a general survey of the sky they are making at that frequency.

In Columbus, Ohio, Dr. John D. Kraus of Ohio State University has set his large aerial to search for possible radio radiation from Mars at 11 meters. So far he has found "nothing positive" to indicate atmospheric disturbances on Mars.

Harvard College Observatory's new 60-foot radio telescope is also expected to be trained on Mars soon. It will be used at a wavelength of three or four centimeters.

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## ANTHROPOLOGY

# Discuss Race, Evolution

Russian delegation, for the first time, attends the International Congress of Anthropological and Ethnological Sciences, reporting discovery of very ancient teeth.

► RUSSIAN and American physical anthropologists sat down together in Philadelphia for the first time in many years to discuss questions of race and evolution.

They met at the International Congress of Anthropological and Ethnological Sciences. It is the first time that a Russian delegation has attended in the 22-year history of the Congress.

Anthropologists from seven nations agreed on the mechanisms that make race. A Russian physical anthropologist, Prof. G. F. Debets of Russia's Institute of Ethnography, reported recent studies of peoples in Russia. The simpler characteristics, such as blood groups and hair color, differ greatly from village to village, he said, but more complicated characteristics, such as various body measurements, are more likely to be the same.

The extent to which genetic changes, taking place in small, isolated groups, can influence the characteristics of larger groups if the small groups increase rapidly in population size was pointed out by Dr. Gabriel W. Lasker of Wayne State University College of Medicine.

Race in man is not a fixed, static thing; a race may change markedly in the course of only a few score generations, Dr. Stanley M. Garn of the Fels Research Institute, Yellow Springs, Ohio, reported.

He cited the example of the small size of desert people, and the plump but compact build of Eskimos. Since these body builds have a distinct advantage, one in throwing off heat and the other in conserving it, they give a better chance for survival. More individuals of the appropriate build will live to reproduce themselves.

It is in this indirect way that environment affects heredity and race differences, Dr. Garn concluded.

Recent discoveries indicate, he said, that genetic changes are now taking place within populations, showing that some races, at least, are now in a process of evolution.

## Find Teeth of Ape-Man

► TEETH of one of man's most ancient ancestors have been uncovered in Russia, a Soviet scientist reported.

The find consisted of two upper premolars similar to those of a chimpanzee but having specific peculiarities like those of man.

The teeth's human characteristics are shown by the fact they were worn on the cheek side and not on the tongue side, as were teeth of the chimpanzee and his ancestor, the preconsul.

The discovery does not show that Russia was the cradle of mankind. The question of where man first appeared cannot be settled definitely today, Prof. G. F. Debets said.

The molars were discovered in Georgia, U.S.S.R., in 1939. However, the report made in French by Prof. Debets at the International Congress of Anthropological and Ethnological Sciences held in Philadelphia was the first time the Russians had let the Western world in on recent archaeological finds in the U.S.S.R.

Prof. Debets calls this ancient ape-man "Udabnopitheque." He lived in early Pliocene or late Miocene times.

Modern man did appear on Russian soil in ancient time, Prof. Debets said. Chellean hand axes have been found in Armenia, and Acheulean implements, differing from Chellean flints in that they are chipped on all surfaces, have been unearthed in southern White Russia, on the Black Sea and in the Ukraine.

Dr. Debets said the Russians also have found remains of two children. A Neanderthal skull was discovered in 1938 in a cave called Techik-Tache in Ouzbekistan, Prof. Debets reported. This skull has only recently been examined.

The skeleton of another baby, about a year and a half old, adds a further chapter to the story of man's development. It was found in a cave in the Crimea and dates back to Neanderthal times.

Despite big teeth and other primitive characteristics, this baby is "incontestably" a representative of *Homo sapiens*.

Three theories have been proposed to account for these two discoveries:

1. The skull is dated incorrectly. Prof. Debets does not believe this.

2. The baby from the Crimean cave is a representative of *Homo sapiens* who lived in the same geological age as Neanderthal man. Prof. Debets does not accept this idea either.

3. Prof. Debets suggests that the Crimean cave baby might have lived at a transition time slightly before the New Stone Age.

## Living Stone Age Tribe

► PYGMIES who still live and practice the customs of a Stone Age people were described by the first outsider to make friends with them and live to tell it.

The living Stone Age people are the Ongees, Prof. Lidio Cipriani, retired from the University of Florence, Italy, told the Congress.

They live on the strategic Andaman Islands in the Bay of Bengal between Singapore, Calcutta and Ceylon. Until 1952, when Prof. Cipriani made friends with the small inhabitants of the Islands after four years of effort, no white man had been able to explore the interior of the Islands and come away alive.

The Onge people have never learned to make fire. They have and use fire, however, but it is hoarded fire set by nature. It is the solemn duty of the women of the tribe to keep these fires eternally burning.

Prof. Cipriani's research has enabled anthropologists for the first time to observe the making of a "kitchen midden," a heap of household rubbish. It is from the "kitchen midden" that scientists have gleaned much of the information about our ancestors.

On the Andamans the Onge people are piling up broken shells, bones from their dinners, human bones from their dead and other household refuse on the same old middens. Prof. Cipriani has calculated the heaps on the Andamans have been building for between 4,000 and 5,000 years.

The Onges wear no clothing and live on a diet of hog, honey and fish. The pigs on the Islands swam ashore from a wrecked boat and have gone wild. They are the only mammals on the islands.

Although naked, the Onge people ap-



**LOVING MEMORY**—When a man dies in the Andaman islands, his wife removes his jaw bone, decorates it with loving care and wears it around her neck for the rest of her life. The customary decorations of shredded leaves have been removed in this case for the sake of the photograph. This widow has had two husbands although only one at a time.



**PRIMITIVE DRESS** — This naked Ongi man appears to be elaborately dressed because of his covering of geometric painted designs applied by his wife.

pear to be clothed because their bodies are covered in painted geometric designs applied by the women of the tribe. Pipes made from claws of crabs are smoked.

When a man dies, the widow removes his jaw bone, decorates it and wears it around her neck for the rest of her life.

The body of the dead man is buried under his bed.

### Scientists Study Indians

► THE AUTOMOBILE is replacing the traditional horse among the Navajo Indians in the American Southwest, Dr. Evon Z. Vogt of Harvard University's Peabody Museum reported.

Increased travel from Navajo country into white towns and cities has tended to break down the isolation of the Indians. At the same time, the automobile is serving to hold the tribe together.

The new mode of transportation has made it possible for more Navajos to attend the large ceremonials of the tribe, such as the Night Chant and the Mountain-Top Way. Cars have also made it much easier for a Navajo family to import a singer who knows the traditional songs to take part in local community ceremonials.

During the last ten years, Dr. Vogt said, the number of automobiles owned by the Navajos has increased at least fourfold. The horse and wagon are becoming a thing of the past.

It is not just the "modernized" Indian who is driving a car but the "backwoods" Navajos, Dr. Vogt noted.

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### PSYCHOLOGY

# Reaction to Brainwashing

► THE REACTION of the American public to Communist brainwashing of American war prisoners is in some ways as disturbing as the brainwashing itself, according to Dr. Raymond A. Bauer of the Massachusetts Institute of Technology, who has been co-director of research of the Harvard Project on the Soviet Social System.

The violent reaction of Americans may indicate, Dr. Bauer told the American Psychological Association meeting in Chicago, that "we share in common with the Communists a lack of security in our own ideological beliefs, even though we both proclaim our confidence that we have the true way of life."

Actually, the record of the American POW is remarkably good in resisting Communist brainwashing tactics, Dr. Bauer said.

Yet a sizeable proportion of the American public has taken the position that it is unthinkable for even a single American to fall for Communist propaganda or to collaborate with the enemy unless he has been subject to unnatural influences.

Americans feel it would take a combination of the theories of the Russian physiologist Pavlov and the wiles of Fu Manchu (fictional villain of Sax Rohmer's hair-raising movies) to cause a single American soldier to collaborate.

The wonder actually is, Dr. Bauer believes, that the Communists should have gone to such a great amount of trouble to produce collaboration, confession or change

of ideology; that they should be willing to devote so much energy to the conversion of persons who disagreed with them, rather than that they should have succeeded in the case of such an exceedingly small fraction of American POW's.

However, a single American soldier converted to Communism, he said, could arouse our feelings of anxiety and guilt over our own repressed ideological doubts. Hence, our eagerness to attribute such conversions to demonic machinations.

Dr. Bauer discounts the influence of Pavlov's theories in brainwashing tactics. The influence of Pavlov in Russian political and military affairs went out when Stalin came into power, he has found.

The effect of semistarvation on making men docile and willing to accept the will and judgment of others was reported to the same meeting by Dr. Josef Brozek of the Laboratory of Physiological Hygiene at the University of Minnesota.

Stresses, he said, even though they cannot strictly be classified as "torture" or even "maltreatment," may result in severe personality deterioration.

He reported very dramatic results obtained in a matter of only days when he kept subjects on a diet totally deficient in thiamine, or vitamin B1. Depression rose to frightening extents and the subjects also showed a substantial rise in hysteria and hypochondriasis.

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### BIOCHEMISTRY

# Fish Test Mental Drugs

► GUPPIES swimming in their fishbowls are likely to help the chemical attack on mental disease.

Studies showing that these little fish are a good tool for this purpose are reported by Drs. Doris L. Keller and Wayne W. Umbreit of the Merck Institute for Therapeutic Research, Rahway, N. J., in *Science* (Aug. 31).

The abnormal behavior can be permanently induced in the guppies by treating them with indole and LSD, the latter a chemical that induces hallucinations in humans. The guppies return to normal when given reserpine, tranquilizing drug widely used in treating human mental patients.

When guppies are put for one hour in a solution containing LSD and then transferred to water, they develop a characteristic vibrating behavior. They swim rapidly until they reach the wall of the bowl and then continue to swim, apparently unaware that they are not making any progress.

Goldfish under the influence of LSD tend to swim backward. Cave-fish do not move at all. All kinds of fish respond to other hallucinating drugs, such as mescaline and

yohimbine, but in a different and often less characteristic way than to LSD.

Serotonin, antagonistic to LSD in humans, had no effect on the guppy's response to LSD. The related chemicals, indole and tryptamine, however, had a marked effect. One hour's exposure to either of these, followed by one hour of LSD, markedly prolonged the LSD effect.

Abnormal behavior persisted as long as a week, sometimes for months, when the guppies were treated first with indole and then with LSD.

The abnormal behavior would alternate with periods of normal behavior, and consisted of normal behavior conducted in an exaggerated and abnormal manner. The courtship pattern of the guppies, however, was not disturbed.

Although reserpine made the guppies behave normally and remain so, chlorpromazine, another tranquilizing drug widely used for human mental patients, was very toxic to the fish. It did not make their behavior normal, perhaps because it had to be used in such small doses.

Science News Letter, September 15, 1956

## PSYCHOLOGY

**Lightly Sleeping Person Is Readily Suggestible**

► PERSONS in a "light sleep" are even more suggestible than those under hypnosis, tests by Dr. Theodore Xenophon Barber of American University, Washington, have shown.

Dr. Barber gave seven standard tests of suggestibility to 22 subjects in the middle of the night while they were sleeping in their own rooms.

The test was begun by entering the bedroom and whispering "Clasp your hands together." All 22 clasped their hands within ten seconds. Three of the subjects woke up. Another seven either moved or opened their eyes and later stated that they were "drowsy" during the experiment.

The other 12 seemed to be sleeping lightly. They did not stir and continued to breathe slowly and easily.

The majority of these sleepers responded to the tests of suggestibility as if they were in at least the third stage of hypnosis. They later remembered nothing of the experiment or they followed the suggestion "you are becoming very thirsty and will wake up in exactly five minutes and drink lots of water."

After Dr. Barber had repeated the same tests on the same subjects when they were under hypnosis and when normally awake, he found that in light sleep the persons were more suggestible than under hypnosis. When they were wide awake, they responded very little to the suggestions.

Dr. Barber, who is now located at the Psychological Clinic at Harvard University, reports his preliminary findings in *Science* (Aug. 31). The experiments were designed to determine the relationship between the hypnotic state and the condition of normal sleep.

Science News Letter, September 15, 1956

## GENERAL SCIENCE

**Atoms Could Make Antarctic Inhabitable**

► ATOMIC ENERGY could turn the Antarctic into the globe's seventh habitable continent, the president of the British Association of Science reported to the annual meeting in Sheffield, England.

Sir Raymond Priestley, who accompanied the English explorer Ernest Shackleton to Antarctica in 1908, made his prediction in the form of a question during his presidential address. Sir Raymond is also chairman of the British Royal Commission on Civil Service.

"If atomic-powered icebreakers can be built," he said, "why not atomic-powered settlements on the Antarctic mainland?"

Soundings the note, "anything can happen in this day and age," Sir Raymond foresees the Antarctic as the world's surplus food locker, as well as a great mining area. He cautioned that everything depends on an economic objective. The chances are, he

said, that Antarctica will be the scene of scientific investigations only for the next 50 years.

However, these possibilities exist, Sir Raymond told the Association:

1. The Antarctic might have a future use as a vermin-free store for the world's periodical surpluses, where they might be preserved against the needs of future generations.

2. There must be great and valuable mineral deposits in any continent of this size and kind, even though nothing of significance has so far been found. Once located, however, the entire mining operation could be moved underground.

3. Atomic power could maintain populations in remote areas like the Antarctic.

4. Antarctic gales might be harnessed as another source of power.

In reviewing the battle of "Twentieth-Century man against Antarctica," Sir Raymond said "now that atomic energy is available and atomic power is immediately ahead, the mere strategic threat of a monopoly of Antarctica by any one power should by itself suffice to keep the interest of nations alive."

Science News Letter, September 15, 1956

## PSYCHOLOGY

**Curiosity Pays Dividends, Psychologists Are Told**

► IT PAYS to be curious about the world around you, especially if you are a high school science student.

That was reported to the American Psychological Association meeting in Chicago by Dr. Steuart Henderson Britt and Dr. Harold A. Edgerton, members of the board of judges for the annual Science Talent Search for the Westinghouse Science Scholarships.

They emphasized that students should take practical steps to satisfy their curiosity as a major step to be considered for the scholarship awards.

The Science Talent Search is conducted by Science Clubs of America, administered by SCIENCE SERVICE.

Science News Letter, September 15, 1956

## PUBLIC HEALTH

**Test New Drug for Athlete's Foot**

► A NEW COMPOUND is under test as an athlete's foot remedy at Rutgers College of Pharmacy, Newark, N. J. It combines iodine and thymol, the synthetic form of the spice, thyme.

A cream or ointment containing the compound is being tested against athlete's foot and other fungi both in the test tube and when transplanted into shoes.

The research has been carried on by Drs. John M. Cross, Clarence A. Discher, Pierre Smith, Morton J. Rodman and Louis D. King and Prof. Michael Iannarone.

Science News Letter, September 15, 1956

## BIOLOGY

**Dean of Gorillas Has 30th Birthday**

► THE WORLD'S OLDEST GORILLA in a zoo had his 30th birthday party in August.

Bamboo, who lives at the Philadelphia Zoological Garden, is the dean of all gorillas in captivity. His exact age is unknown, because he was born deep in West Africa's tropical forest, but gorilla experts figure he was about one year old when he came to the zoo on Aug. 5, 1927.

No one thought he would live very long during those first critical months in captivity. Gorillas do not thrive behind bars. But he was given a chimpanzee playmate and plenty of medical care. Today the burly anthropoid is about as old as a man of 60, figured by gorilla time.

No one has weighed Bamboo recently, but his keepers say he probably tips the scale at well over 400 pounds.

He is still active, especially on his birthdays, when he scatters his gifts in a display of temper.

Science News Letter, September 15, 1956

## GENERAL SCIENCE

**Apprentice System for Talented Science Students**

► AN APPRENTICE SYSTEM for talented science students that would bring the superior high school or college student into close contact with a scientist who would act as his sponsor was urged by Dr. Randall M. Chambers of the Operator Laboratory, Air Force Personnel and Training Research Center, San Antonio, Texas.

Dr. Chambers reported to the American Psychological Association meeting in Chicago results of science training programs at the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine.

Superior college and high school students picked competitively from a variety of schools in the United States live for two and a half months at Jackson Laboratory. There they work in close association with active research scientists in the fields of experimental medicine, biology and psychology.

The personal relationship between a talented science student and a scientist is a very powerful influence in promoting development of the student's scientific abilities, aptitudes interests and social values.

To have such an influence made available to a student at a critical period in his life exerts beneficial effects on his later scientific development and achievement, Dr. Chambers said.

Science News Letter, September 15, 1956



# CE FIELDS

## MEDICINE

## Cancer Resistance Transferred by Blood

► BLOOD SERUM from rats that have grown resistant to a transplanted cancer can make other rats resistant to the cancer, Drs. B. Sekla and M. Barvic of Charles University, Prague, Czechoslovakia, report in *Nature* (Sept. 1).

The reason, they think, is that the transplanted cancer came originally from the Walker strain of rats while those that developed resistance transferable to other rats were of the Wistar strain.

Science News Letter, September 15, 1956

## RADIO ASTRONOMY

## 2,000 Radio "Stars" Spotted in Heavens

► NEARLY 2,000 invisible radio "stars" have had their positions in the sky mapped, the British Association for the Advancement of Science meeting in Sheffield, England, was told.

Radio "stars" are heavenly sources radiating energy in radio wavelengths just as the twinkling stars humans see radiate energy in the visible wavelengths. Very few of these sources have been identified with objects visible to the eye or caught on photographic plates, Dr. J. R. Shakeshaft of the University of Cambridge reported.

Only two bands of radiation that can penetrate the earth's atmosphere to reveal information about what lies beyond are now known. One is the visible and nearby wavelengths, the other radio waves about an inch long to those about 100 feet long.

Radio waves broadcast by heavenly sources are picked up here on earth by giant antennas known as radio telescopes. Because the signals are extremely faint, about ten thousand times smaller than those received by a typical television antenna, large aerials are needed to scan the skies.

An aerial with the same ability to determine the position of a radio "star" as the eye has to tell the location of a visible star would have to extend for ten miles, Dr. Shakeshaft said.

To obtain accurate positions in order to identify more sources, a radio telescope consisting of four aerials each 320 feet by 40 feet at the corners of a rectangle 1,900 feet by 170 feet was built at Cambridge. Area for area, Dr. Shakeshaft noted, the antenna cost about the same as linoleum.

Counts of the number of heavenly radio "stars" brighter than a particular intensity show that there are more faint sources than would be expected if they were distributed uniformly through space. Evidence on how the radio sources are distributed conflicting

with this non-uniformity has been obtained in Sydney, Australia.

If the uniform distribution is correct, Dr. Shakeshaft said, most of the 2,000 radio sources so far found are beyond the reach of the world's most powerful telescope, the 200-inch Hale telescope at Mt. Palomar.

When the conflicting evidence is resolved, conclusions may then be drawn about different cosmological theories, whether the universe is evolving with time or whether it is in a steady-state, involving the continuous creation of matter.

Science News Letter, September 15, 1956

## ZOOLOGY

## Crabs Change Color In Time With Tides

► CRABS with built-in "clocks" and diving ducks with "slowed-down hearts" were described by zoologists at the American Institute of Biological Sciences meeting at the University of Connecticut.

Both blue crabs and fiddler crabs have been found to change their color in perfect co-ordination with coastal tides, Dr. Milton Fingerman, assistant professor of zoology at Tulane University, reported. Each crab, the zoologist said, seems to have a personally adjusted "clock."

Tiny black spots on the crabs' bodies spread during the daylight hours to darken the small sea animals. The change apparently is caused by a hormone secretion. The crabs are darkest in accordance with the stage of the tide wherever the crab has made its home.

On the Atlantic coast, where there are two high tides and two low tides each day, the crabs are darkest at low tide only. On the Gulf coast, where there is only one high and one low tide per day, the crabs are darkest at either tide when it falls during daylight hours.

The crabs used by Dr. Fingerman in his experiments kept their same rhythmic pattern of color change when placed in the laboratory in constant darkness.

When birds peel off and dive head-on into water, their heart beat slows down an average of 75%, Prof. Perry W. Gilbert and Charles F. Bond of Cornell University, Ithaca, N. Y., reported.

This, coupled with a relatively higher volume of blood, may explain how diving birds manage to stay under water for long periods.

The Cornell zoologists used an electrocardiograph to record the heart rate of diving ducks, wild pigeons, dabbling ducks, chickens and turkeys. They found that, when water birds were ducked, their heart rate slowed down from 180 to 45 beats per minute. The land birds' heart rates dropped only 10 to 25%.

A heart running at quarter-speed, they explained, uses much less oxygen and the relatively greater blood supply provides more oxygen. This increased oxygen may be the clue to why aquatic birds can survive for as long as 15 minutes underwater.

Science News Letter, September 15, 1956

## CLIMATOLOGY

## World Weather Changed About 11,000 Years Ago

► A WORLD-WIDE temperature change, reflected in the ocean's surface water, occurred about 11,000 years ago, new studies of deep-sea sediments show.

Four scientists on the staff of Columbia University's Lamont Geological Observatory in New York report new radiocarbon dates for the climate change in *Science* (Aug. 31).

Although the samples of ocean floor, taken at widely spaced locations beneath the Atlantic Ocean, "show evidence of a gradual beginning of climatic change 13,000 to 15,000 years ago," the major break was close to 11,000 years ago. The shift from more or less stable glacial conditions to mild postglacial climate resembling the present was "rather sudden."

The usual view is that there was a gradual change from the relatively cold to the relatively warm regime.

Differences in the kinds of tiny sea animals, the plankton known as *Foraminifera*, in hundreds of cores of ocean sediment show the transition from glacial to postglacial periods. The radiocarbon dating was done to correlate this change with known events on the continents.

The studies are reported by Drs. David B. Ericson, Wallace S. Broecker, J. Laurence Kulp and Goesta Wollin. The research was financed by grants from the National Science Foundation.

Science News Letter, September 15, 1956

## PSYCHOLOGY

## Mathematical Theory Can Predict Prisoners' Bets

► DECISION THEORY can be used to predict what men will bet on the throw of dice when they have a choice in gambling at various odds.

This was reported to the American Psychological Association meeting in Chicago by Dr. Paul M. Hurst of St. Lawrence University, Canton, N. Y., and Dr. Sidney Siegel of the Pennsylvania State University.

They based their conclusion on what happened when bets were offered to prisoners at the Northeastern States Federal Penitentiary. The bets were real and were paid off in cigarettes, a very valuable commodity in a prison and one which is negotiable.

An accurate prediction is possible, however, only when the scientist knows the subjective value placed by the individual prisoner on a cigarette. The same objective quantity of cigarettes has a different subjective value for different prisoners, the scientists found.

The decision theory applied in this experiment is related to Prof. John von Neumann's theory of games. The decision theory can be used, Dr. Siegel explains, to understand important social conflict situations, economic competition, war, political conflict and intergroup strife.

Science News Letter, September 15, 1956

## OCEANOGRAPHY.

# Scientists Go to Sea

**More and more scientists are taking to the sea in the summer. They do not take pleasure cruises, even though they travel in trim boats, but are on floating laboratories.**

By RICHARD MAGAT

Science Service Correspondent

► NOT EVERY SLEEK YACHT and cabin cruiser seen afloat this summer was bent on pleasure. Some were "floating laboratories," carrying scientists exploring a range of subjects from marine biology to beach erosion.

The eminent 19th century British mathematician Lord Rayleigh said, "The basic law of the seaway is the apparent lack of any law."

The sea voyager still knows far less about what he will encounter than a bus or train rider, as the recent collision of the Andrea Doria and the Stockholm tragically showed.

Yet modern oceanographers, mathematicians, naval architects and others are steadily modifying Rayleigh's aphorism with remarkable strides by formulating general rules about the complex and apparently unpredictable behavior of the three-fourths of the earth's surface that flow about the continents.

Much of their work is analytical and mathematical, and an oceanographer can make significant discovery about the sea's behavior while sitting at a desk miles away from any coastline. Also, high-speed digital and analogue computers and other electronic devices are some of the oceanographer's most valuable new tools.

## Many Institutions Are Active

A vast amount of field study remains, nevertheless, as witnessed by the increased tempo of activity by scientists at sea this summer.

The Woods Hole, Mass., Oceanographic Institution in June commissioned a new research vessel, the Crawford. A converted 125-foot Coast Guard Cutter, the ship is being used to explore Caribbean waters east of San Juan, Puerto Rico, birthplace of many hurricanes that plague the East Coast of the United States.

More recently, New York University put into service a 65-foot auxiliary schooner, Action. Working this year in Long Island Sound, the vessel's initial tasks are to study the role played by tiny ocean waves less than two inches high in reflecting radar beams from aircraft flying over water, and the effect of sea surface conditions on the tough problem of accurate long-range weather forecasting.

Smaller research ships are also in service.

The American Museum of Natural History and N.Y.U. geologists are using a 33-

foot motor launch in a new three-year study of the bottom of Long Island Sound. This venture is more geology than oceanography, for its purpose is to find clues to the formation of petroleum in sediment composed of plants, tiny microscopic invertebrates and man-made wastes.

Research vessels from Columbia's Lamont Geological Observatory continued their deep-sea studies with the aid of new devices for sampling the ocean floor.

The Scripps Institution of Oceanography and Johns Hopkins University are other leading centers where sea research is conducted.

There are land-locked experimental facilities for sea studies as well. New ship designs are tested in model form at the David Taylor Model Basin in Carderock, Md., and a similar installation at the Stevens Institute of Technology, Hoboken, N. J.

At these locations, models are towed through an especially instrumental tank filled with water. Calculations of ship

stability and behavior under various speeds and hydrographic conditions may be made.

A special wind tunnel at New York University's engineering research division will be converted this fall to an experimental water tank for the study of capillary waves. In the past, the tunnel has been used to study models of industrial plants in an effort to prevent or control air pollution problems.

In its temporary new role, it will simulate the tiny capillary waves that are of current interest because they seem to affect radar from aircraft.

Capillary waves are so called because they arise, not from winds as most ocean waves, but from the type of capillarity associated with surface tension phenomena. Because their slopes are greater, they seem to influence radar beams more than the large gravity waves. Capillary wave data obtained from the Action will be tied in with findings in the tunnel.

The role of oceanography is growing also because of the increased "mining" of the sea and the ocean bottom. Not only do hundreds of oil well structures dot coastal waters, but industry is looking to the sea for magnesium, bromine, sulfur and metallic ore-bearing sands.



**SCIENTIFIC TORPEDO**—This small torpedo-like device, held by Capt. Harry E. Rogers, is harmless. It is a bathythermograph, thrown overboard to measure the temperature of the sea at different depths. Capt. Rogers is skipper of the newly commissioned New York University oceanographic vessel, Action. In the background is Dr. Gerhard Neumann, professor of oceanography at New York University. Like other scientists throughout the nation, they are taking to the sea to learn its secrets.

One of the most significant trends is the increased attention to oceanographic events in an effort to improve weather forecasting, especially the long-range, or 30-day and longer, variety.

For the last few years, for example, under Office of Naval Research and Weather Bureau sponsorship, meteorologists and oceanographers have been seeking to find precisely how the circulation of the earth's atmosphere—the large wind systems sometimes called air tides—responds to ocean currents and water temperature changes.

One outgrowth of such studies was a broad theory of ocean current circulation by New York University's Dr. Gerhard Neumann. It takes into account such diverse factors as the curvature and rotation of the earth, vertical variations of ocean density, and the depth of the bottom of circulating ocean masses.

### Predict Ocean Waves

Dr. Neumann and a co-worker, Dr. Willard J. Pierson Jr., are also responsible for a major attack on the "mystery of the sea." They have formulated and put into practice theories for predicting the spectrum of ocean waves.

Their results, in the form of a forecasting manual, were published by the Navy and issued to all its ships. Despite its length—350 pages—authorities call it an unusually practical device for predicting ocean wave behavior. It is essential, for example, for a naval commander getting ready to be refueled from another ship in a relatively calm sea, to know that in the next 15 minutes he can expect a 20-foot high slaming wave.

Similarly, an aircraft carrier calling its planes in for landing wants to know as accurately as possible the state of the sea in the very short future. The Neumann-Pierson theory permits naval officers, even those with relatively light technical training, to do this with high statistical accuracy.

What Drs. Neumann and Pierson did was to break up—in mathematical terms—the various components of an ocean wave, just the way a beam of light is broken into various colors by a prism can be described mathematically. With this foundation, they brought statistical mathematics

to bear on the problem of forecasting wave height and frequency, on the basis of various wave properties and meteorological conditions.

Not only is this significant in naval operations, but also in harbor, seaplane and ship design, and shore protection.

The last problem is another fertile field for the oceanographer's talents. Some estimates say the coast line of the United States is receding at an average rate of one foot a year. The erosion problem along the Jersey Coast was particularly critical a few years go. At one point, a jetty erected for test purposes trapped 70,000 cubic yards of sand that ordinarily would have been washed off the coast.

### Shore Protection Problem

Beach erosion specialists and government authorities need the oceanographers' guidance in order to get the most from their shore protection expenditures.

Electronics is also helping in the technical battle against beach erosion. Research engineers have developed, under contract with the U. S. Beach Erosion Board, an electronic ocean wave analyzer. This does in five minutes the laborious mathematical computations that previously required two weeks by hand. Smaller and considerably less expensive than a computer, the analyzer "feeds" on magnetic tape records of ocean waves. The records are obtained from signals sent out by pressure gage-transducer systems submerged offshore.

The envelope of air around the earth is, like the ocean, a fluid. Both ocean and air experience solar and lunar tides. Like the Gulf Stream and the Humboldt Current cut through the ocean, planetary currents of air swirl about the globe. These similarities, plus the constant interaction of the two media, demand close co-operation between meteorologists and oceanographers.

### Aid Hurricane Research

Hurricane research is one instance of this interaction. The Woods Hole ship, Crawford, is expected to provide valuable supplementary hurricane data to the increased aerial reconnaissance planned by the Weather Bureau and the armed services for the 1956 hurricane season. Edwin Fisher, who directs a hurricane research project at N.Y.U., said hurricane forecasting might be improved with better records of sea surface temperatures in the hurricane spawning grounds.

To date, most of the records available come from merchant shipping in the period preceding the hurricane season. When hurricanes threaten, naturally, ships avoid these areas. Researchers are poring over existing records in an effort to establish the direct relationship between pre-hurricane sea temperatures and the incidence and path of the violent storms.

In addition, they hope that experience with the Action will lead to improved in-

(Continued on page 173)

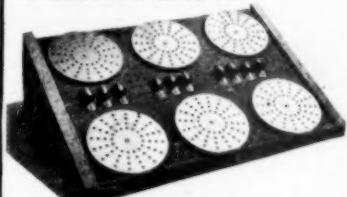
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# Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D.C. Request free publications direct from publisher, not from Science Service.

**ALCOHOLISM AS A MEDICAL PROBLEM**—H. D. Kruse, Ed.—*Hoover-Harper*, 102 p., \$3.00. A record of a conference held under the auspices of the Committee on Public Health of the New York Academy of Medicine and the New York State Mental Health Commission.

**FOREST RANGER**—John J. Floherty—*Lippincott*, 143 p., illus., \$2.75. Telling young people the story of men who guard the forests of our country.

**THE GREAT PHYSIODYNAMIC THERAPIES IN PSYCHIATRY: An Historical Reappraisal**—Arthur M. Sackler and others, Eds.—*Hoover-Harper*, 190 p., illus., \$5.75. Each of the contributors relates the historical development of the method associated with his work, and evaluates it in the light of present knowledge.

**GREEN DARER: The Story of a Dragonfly**—Robert M. McClung—*Morrow*, 48 p., illus., \$2.00. A child's story of the life cycle of the dragonfly.

**INSECTS AND THEIR WORLD**—Carroll Lane Fenton and Dorothy Constance Pallas—*Day*, 95 p., illus., \$2.95. Telling for children many fascinating facts about the largest group of fauna that lives on our earth.

**LABORATORY EXPERIMENTS IN GENERAL CHEMISTRY**—G. Brooks King and William E. Caldwell—*American Book Co.*, 324 p., illus.,

paper, \$3.25. The experiments are arranged to accompany the authors' text, "The Fundamentals of College Chemistry."

**LATEX: Natural and Synthetic**—Philip G. Cook—*Reinhold*, 231 p., illus., \$3.50. Showing how both natural and synthetic types of rubber latex are produced, modified and finally converted into useful products.

**LITTLE KITTEN, BIG WORLD**—Victor and Jeanne Baldwin—*Morrow*, 30 p., illus., \$2.00. The picture story of a Siamese kitten's first venture into the out-of-doors.

**ORGANIC CHEMISTRY FOR THE HOME LAB**—Burton L. Hawk—*Science Service*. Chemistry Burton L. Hawk—*Science Service*. Chemistry 96 p., illus., \$2.00. Experiments for the "part time" chemist to perform, most of which can be done with ordinary equipment and reagents available from laboratory supply houses.

**RESEARCH TECHNIQUES IN SCHIZOPHRENIA**—Jacques S. Gottlieb and others, Eds.—*American Psychiatric Association*, Psychiatric Research Reports 5, 153 p., illus., paper, \$2.00. Five papers plus discussion presented at the Mid-Atlantic Regional Research Conference, March, 1956.

**SATELLITE!**—Erik Bergaust and William Belter, with foreword by Hermann Oberth—*Hans Over House*, 287 p., illus., \$3.95. A timely book explaining for the layman the earth satellites to be launched during the International Geophysical Year and the knowledge that can be gained from these spinning moonlets, as well as presenting the possibilities and the problems of larger space satellites and, finally, space travel.

**THE STARS: Steppingstones into Space**—Irving Adler—*Day*, 128 p., illus., \$2.95. Explaining astronomy for young people and laymen who wish to learn about the properties and behavior of stars.

**STATISTICAL MECHANICS: Principles and Selected Applications**—Terrell L. Hill—*McGraw-Hill*, 432 p., illus., \$9.00. Written for students and research workers in chemistry, physics and biology who have already some acquaintance with statistical mechanics.

**WHAT MAN MAY BE: The Human Side of Science**—George Russell Harrison—*Morrow*, 278 p., \$4.00. Observing the effects of science on other fields of human affairs and exploring the impact of science on the entire man.

Science News Letter, September 15, 1956

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## ZOOLOGY

### Dancing Honeybees Act As Real Estate Agents

► DANCING HONEYBEES serve as real estate agents for their swarm bent on finding a new home, the British Association for the Advancement of Science meeting in Sheffield, England, was told.

How bees determine whether to take a hollow tree, a barn or a hole in the ground for a new dwelling place was reported by Dr. M. Lindauer of the Zoological Institute, Munich, Germany.

When a newly formed swarm wants to relocate from the older colony, scouting bees are dispatched from the swarm. Soon after, the scouts return and dance before the swarm.

The dances, Dr. Lindauer said, not only tell the thousands of bees in the swarm the exact location of a new nesting place, but "they also give exact details about its quality."

Several groups report to the swarm at once, each group trying to sell the swarm on the choice piece of real estate it has found. Over a period of several days, the zoologist reported, the dancing bees change their step and, gradually, there is a unanimous decision to move to one spot. Not until this decision is reached does the swarm move out.

Careful study of bee swarms shows that the scouts are capable of conveying whether or not the nesting place they have found is a "first, second or third class" domicile.

"When a first class nesting site has been found," Dr. Lindauer said, "the scouting bees begin a very long dance with great vivacity that can last an hour or even longer."

A fairly suitable home, on the other hand, is announced by a modest and lazy dance that stops in a few seconds.

A typical report transmitted to the swarm by dancing scouts might communicate, according to Dr. Lindauer, the fact that there is a good hole in a tree, 2,625 feet to the north.

The scouts, Dr. Lindauer found, are recruited from the swarm from old and experienced forager bees, noted for their dancing ability.

Science News Letter, September 15, 1956

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## Scientists Go to Sea

(Continued from page 171)

struments and techniques for more accurate measurement because the Action, in contrast to larger, deep-sea research vessels, permits oceanographers to "put their noses right down to the sea surface."

For most of the year, the oceanographer can hardly be distinguished from his colleagues in other branches of science. Come warm weather, the call to the sea grows louder, not only because voyages add invaluable knowledge, but because there is in many of the scientists a deeply-rooted love of the sea.

Dr. Neumann, for example, was a sailor before he became a scientist, going to sea at the age of 17 in his native Germany. The ship on which he took his first cadet training cruise, a three-masted bark, was caught in a North Atlantic storm and sank. All hands were rescued and Dr. Neumann went on to more fortunate cruises, including two around Cape Horn.

Later he attended the Hamburg Merchant Marine Academy and became a navigation officer for the Hamburg-American Line. Only after a decade of practical seamanship did he enter the University of Berlin and earn the degree of Doctor of Natural Science.

Dr. Neumann's seafaring instincts stayed with him and were undoubtedly responsible for a prodigious task he undertook a few years ago, work that eventually led to his wave spectrum theory.

Previous wave observations had consisted only of random samples. A complete theory required, first of all, a body of systematic and continuous data, taken by a trained observer. So in 1950 and 1951, sailing on a freighter, Dr. Neumann single-handedly made 27,000 individual ocean wave observations in the Atlantic. This required that he stand on the flying bridge, stopwatch in hand, timing and measuring the waves.

Future oceanographic research, Dr. Neumann hopes for his students' sakes, will not involve first-hand labor to this degree. Busy activity in this field of science and in all other branches of geophysics science is expected to come to a climax during the International Geophysical Year.

Science News Letter, September 15, 1956

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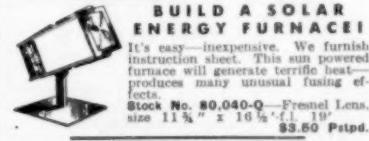


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# Questions

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□ □ □

**ASTRONOMY**—Do astronomers think life will probably be found on Mars? p. 163.

□ □ □

**BIOCHEMISTRY**—How are guppies aiding the fight against mental diseases? p. 167.

□ □ □

**ENDOCRINOLOGY**—What is intermedin? p. 164.

□ □ □

**GENERAL SCIENCE**—How could the Antarctic be made inhabitable? p. 168.

□ □ □

**PSYCHOLOGY**—What does the American public's reaction to brainwashing of war prisoners show? p. 167.

□ □ □

**RADIO ASTRONOMY**—How many radio "stars" are now known? p. 169.

□ □ □

**ZOOLOGY**—How do honeybees communicate location of a new nesting site? p. 172.

□ □ □

**Photographs:** Cover, U. S. Army; p. 165, National Carillon Company; pp. 166 and 167, Lidia Cipriani; p. 170, New York University; p. 176, Supertron Corp.

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## ASTROPHYSICS

# Solar Flare Mechanism

**Astronomer suggests that solar flares result from the same mechanism, the "pinch effect," now being explored as a possible means of controlling thermonuclear reactions.**

► A HINT that the same mechanism producing solar flares might also be useful in controlling the H-bomb's fusion reactions for peaceful purposes is made by an English astronomer.

The mechanism is the "pinch effect." It is a possible method of obtaining the high temperatures needed to fuse, or join, the light elements into heavier ones with release of energy.

Generating the high heat in a controlled manner requires containers that will not melt or be otherwise affected.

Using the "pinch effect" would seem to eliminate the container problem, since the reacting gas column would contract to contain itself, thus not touch any walls.

Dr. T. Gold of the Royal Greenwich Observatory, Herstmonceux Castle, Sussex, suggests that, in the sun, the "pinch effect" may cause the speeding up of particles, resulting in the solar flares, great arcs of hot, glowing gases thrown out of the sun's surface. (See SNL, April 24, 1954, p. 263.)

The pinch effect, Dr. Gold notes, was described by the Russian scientist, Dr. I. V. Kurchatov when, earlier this year at Harwell, he reported Soviet experiments on gas discharges with high density currents. Dr. Kurchatov said their observations showed some particles with energies very much higher than would be expected were produced.

The leading Russian authority on atomic energy told of studies in which temperatures near 1,000,000 degrees Centigrade were reached for very short periods of time by passing large currents through gases like deuterium, using a strong magnetic field to keep the gas ions away from the container walls.

The unexpected appearance of the few very high energy particles in deuterium was detected by the neutrons and gamma rays produced. This phenomenon, Dr. Gold says in *Nature* (Sept. 1), was always "clearly related" to the second constriction of the spark, or "pinch effect."

He proposes that, in sparks constricted in their own magnetic field, there is a mechanism for accelerating a small fraction of the particles to high energies.

In solar flares, Dr. Gold suggests, high energy particles are also present. Electric currents, evenly distributed through large volumes, normally flow in the vicinity of sunspots. When the current density becomes too high, an instability occurs, causing the currents to become constricted along one or several lines due to their own magnetic field.

If this interpretation of solar flares is correct, Dr. Gold says, the Russian experi-

ments would seem to provide an analytical laboratory method for further studies.

The "pinch effect" was first noted by E. Northrup in 1907. Two University of Southern California scientists have reported their studies of this effect, and Atomic Energy Commission scientists involved in Project Sherwood, code name for the U. S. attempt to tame the fusion reaction for peaceful purposes, are believed to be working along similar lines, although their work is shrouded in secrecy.

Science News Letter, September 15, 1956

## Do You Know?

Forty-one different species of termites exist in the United States.

There are nearly a thousand languages in Africa alone.

The average American is expected to eat about 83 pounds of beef in 1956, two pounds more than eaten in 1955.

On its original fuel charge, the atomic submarine Nautilus cruised over 40,000 miles, more than half of the distance under water.

Six bottles of air from the earth's outer atmosphere were collected 75 miles up by steel bottles inside the nose cones of two 20-foot Navy Aerobee rockets.

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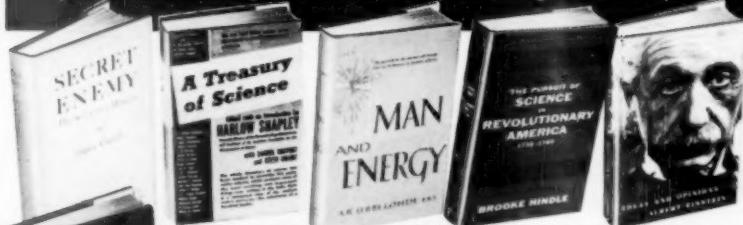
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**PHONE HOLDER** that keeps receiver to your ear and leaves the hands free is available in models designed to match colored telephones. Molded of a butyrate plastic, the shoulder holder device weighs one ounce and has a foam cushion on its underside. No bolts or screws are necessary.

Science News Letter, September 15, 1956

**FURNITURE SUPPORTS** of plastic are described as protecting tufted carpeting against indentations. Tapered teeth push aside the pile of a tufted carpet without crushing the fibers. Weight is distributed over an area two inches in diameter. The supports are available in three colors.

Science News Letter, September 15, 1956

**TRANSISTORIZED KIT** for making a portable radio contains six transistors, a crystal diode and a 40-page manual. Designed for hobbyists and others familiar with radio equipment, the kit can also be used to make amplifiers, oscillators, broadcast receivers and various other devices.

Science News Letter, September 15, 1956

**POOL ALARM**, shown in the photograph, warns parents if children, pets or toys fall into an unguarded swimming pool. A sensing unit installed just above normal water height is set to go off if a body enters the water by breaking the surface ten-



sion. Surface disturbance or turbulence will not trip it. Operating off two pen-light batteries, the alarm requires no electrical connections. It can be turned off when pool is guarded.

Science News Letter, September 15, 1956

**BEER TAP** prevents loss of beer or danger of being showered. For home or

outdoor use, the tap is described as fast, easy and safe to use. Made of a bronze body, a brass valve, a powerful spring, porous bottom washer and a sleeve, the tap can be worked without tools.

Science News Letter, September 15, 1956

**SOLID ELECTROLYTE BATTERY** has an almost unlimited "shelf life." For low current applications, it weighs less than an ounce and is made primarily of silver, silver iodide and vanadium pentoxide. Rated at 95 volts, the battery is one-third of an inch in diameter, one inch long, and consists of 200 paper-thin cells.

Science News Letter, September 15, 1956

**DOUBLE - SPIRAL CORKSCREW** makes it easy to pull the cork from a bottle, even when the stopper is dry. The Swiss-invented corkscrew is twisted until halted by a stop-plate. Turning is then continued as the cork is pulled gently.

Science News Letter, September 15, 1956

**STEEL GARAGE** is a build-it-yourself model. Fire-resistant, warp-proof and weathertight, the garage is available in one, one and one-half and two-car sizes. Assembled with hand tools, the garages come equipped with an all-steel sectional overhead type door.

Science News Letter, September 15, 1956



## Nature Ramblings



"The goldenrod is yellow,  
The leaves are turning brown.  
The trees in apple orchard,  
With fruit are bending down."

► SOME of the surest signs of fall's approach are described in this verse, which many youngsters have learned in school.

The goldenrod's bright sprays have greeted blue skies for many weeks in most parts of the United States. They will continue to mirror back the sun's own color until after the first frosts have signaled the sun's retreat for another season.

Although about 100 kinds of goldenrod are known, few species grow in other countries. For this reason, many people advance the goldenrod's claim to honor as the American national flower. Indeed, three states, Alabama, Kentucky and Nebraska, adopted it as their state flower.

Goldenrod is a member of the largest of

### National Flowers



all plant families, the Composite. Many familiar weeds, such as ragweed, daisy and dandelion, as well as such cultivated plants as the dahlia, chrysanthemum, zinnia, marigold, aster and lettuce, also belong to this family, a very highly developed and widely adapted one.

Symbolically, selecting goldenrod as a national flower would be a good choice, for as a member of the Compositae family, it is actually a whole society of flowers, quite small ones crowded together. This one federated bloom typifies very neatly the old unofficial motto, "E Pluribus Unum."

The Compositae are among plants what bees, ants and termites are among insects—societies rather than individuals.

Principal contender for the National flower against the goldenrod, and as stoutly supported by its advocates, is the columbine, the state flower of Colorado.

This lovely flower also has its unique symbolism: Its common name is an appeal to the dove of peace, whereas its botanical name, Aquilegia, is supposed to be an eagle reference, perhaps inspired by the resemblance of its flower to the talon of our national emblem.

Science News Letter, September 15, 1956